

Barriers perceived by researchers in pursuing medical research in an evolving medical college of tribal Madhya Pradesh, India

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ABSTRACT

Introduction: Doing quality medical research that improves patient care, improves medical education, reduces expenditures, and benefits society at large is an important responsibility, though often underrated. Appropriate measures are required to be taken when a medical college is new. Hence, this provided an opportunity to conduct a study at a current medical institution with the aim of identifying the barriers faced by research in various domains. **Methods:** This cross-sectional study included currently working faculties, including senior residents and demonstrators, as subjects. A structured questionnaire with close-ended responses was used, which covered the baseline characteristics of subjects and perceived research barriers among researchers. After obtaining institutional ethical approval, the study was initiated. During the analysis of the data, an association between variables was significant for P value < 0.05 . **Results:** In the present study, out of 105 eligible subjects, only 98 of them participated. The mean age of the subjects was 36.06 ± 6.48 years. The most frequent barriers expressed were a lack of research training facilities to solve individual research problems (45.9%) and a lack of a sufficient financial budget for research activities (57.1%). The organizational-managerial level domain was significantly associated with the subject's age, designation, and gender ($P < 0.05$). **Conclusions:** The present study identified the barriers faced by the researcher at various levels. Despite the presence of a young workforce, it was surprising to notice that more than half of the faculty members had poor research barrier scores in each of six domains, probably due to a lack of mentorship and acknowledgement, and a lack of skill in using computer-based hardware and software.

Keywords: Acknowledgment, analytical tools, scientific, time, workshop

Introduction

Research, whether it be scientific or systematic review or meta-analysis, is among the key factors required in developing mortal societies. Additionally, the creation of new logical and scientific words will not be feasible in the absence of research. In fact, the study is called one of the important indicators of growth.^[1] The institution of higher education as a manufacturer

and dissemination of knowledge has a vital role in the growth and sustainable development of the country.^[2] Training of human resources, development, and growth of knowledge, identifying problems, and conducting research on them are the main tasks of the institution.^[3,4]

Enhancing research is proven to be the most cost-effective method for the advancement of health in developing nations for the long run.^[5,6] Health research in the field of health systems aims to provide better health care that is more equitable and less discriminative.^[7] However, the research conducted in developing countries is not desirable and scarce, and compared to the developed countries, human resources, budgets, and facilities spent on research are

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trivial.^[8] It is a harsh reality that not a single publication was done in 57% of medical colleges in India over a decade beginning in 2005.^[9]

Undergraduate and postgraduate teaching, patient care, administrative duties, assessment-related activities, serving as a guide for postgraduate dissertations, and mentoring are all obligations of a medical teacher. Residents and faculty conduct the majority of the research.^[10]

Over the last few years, there has been increased research curiosity to study the factors that are acting as barriers for faculty members in carrying out research, and it was observed that the major hurdles that are lying in the path of smooth conduct of research include monetary reasons, lack of timely access to new and relevant statistics and evidence, rapidly changing administration and regulations, the lack of professional researchers, poor selection and administration, and the lack of hindering research programs that block the pathway of research.^[11]

Though medical research usually does not get that much importance, conducting research in a quality manner enhances both patient care and medical education, which results in economic health services benefitting the community on a larger scale.^[12,13] Appropriate measures are required to be taken when a medical college is new and is in an evolving phase so that no lacunae are left to enhance the environment conducive for good research. Also, The Medical Council of India has made it mandatory to publish original articles as a prerequisite for promotion. All newly recruited teachers are also required to undergo a course in research methodology within a specified time. Hence, this provided an opportunity to conduct a study at our medical institution with the aim of identifying the barriers faced by the researcher at the individual, professional, facility, financial, scientific, and managerial-organizational level.

Removal of such barriers will enable researchers to conduct various types of projects, including community-based projects, and findings from such projects shared with primary care physicians and family physicians will provide them with a better scenario of community-level health problems and help them to prioritize their actions.

Materials and Methods

Study setting and design

This cross-sectional quantitative study was conducted at Government Medical College, Shahdol, Madhya Pradesh for a duration of one month (June–July 2021) after getting ethical approval. The Government Medical College, Shahdol, was established in 2019 under the Government of Madhya Pradesh Act, and the medical college recently admitted its second batch of MBBS students.

Study population and sample size

The study subjects included all the faculties, including senior residents and demonstrators, currently working at GMC Shahdol

at the time of the study. The list of those study subjects was obtained from the Dean's office along with their contact details (phone and email), which came to around 105 eligible subjects. The subjects with whom no contact was made on three or more consecutive attempts were excluded from the study.

The sample size was calculated ($n = 97$) considering the proportion of faculty having good research barriers score as 50% (studies not found in Madhya Pradesh) with a confidence level of 95% and 10% absolute allowable error by applying the following formula: $n = (Z^{1-\alpha/2})^2 \times p(1-p)/d^2$; where Z = Standard normal variate for level of significance [at 5% type I error ($P < 0.05$), $Z = 1.96$ for a 2-sided test], α = level of significance (0.05), P = prevalence (proportion-50%), d = absolute allowable error (10%), n = sample size. Thus, all eligible study subjects, which counted to be 105, were included in the study using the convenience sampling method.

Study tool

A self-administered and structured questionnaire with closed-ended responses, adapted from the studies by Alamdari *et al.*^[14] and Nath and Kumari,^[15] was used to collect the data from study subjects. The questionnaire was pilot studied among a small number ($n = 10$) of subjects, and the average time taken to complete the questionnaire was 15–20 minutes. The questionnaire was subjected to content validation by a panel of 15 medical experts, and the Cronbach's alpha of the questionnaire was 0.90. According to the objectives of the study, all efforts were made to keep the questions simple and unambiguous. Refinements were made as required to facilitate better comprehension and organize the questions before the final distribution of the questionnaire to study subjects.

The questionnaire collected information regarding perceived research barriers among study subjects, particularly in 6 domains, namely, individual level (11 items), professional level (6 items), research facility level (5 items), financial level (3 items), scientific level (4 items), and managerial–organizational level (4 items).^[14] The scores on the items for each domain were assigned equivalent points on the five-point Likert scale (5 = completely disagree, 4 = disagree, 3 = neutral, 2 = agree, 1 = completely agree). The questionnaire also gathered other required information about the subject's baseline data, such as age, gender, total years of experience in the current institution, designation (such as professor, associate professor, assistant professor, senior residents, and demonstrators), total publications, number of publications in the current institution, and total CME/Conferences/workshops attended before or after joining the current institution.

Data collection

Participation in this survey was completely optional, and no reward was offered. Study subjects were contacted and recruited via online communities (Facebook, Twitter, and WhatsApp) after the Institutional Ethics and Review Board (IERB)

approved the study. Password-protected survey links were put on the same.^[16] The survey link included an introduction paragraph detailing the study's objectives, as well as directions on how to complete the questionnaire, emphasizing that all questions are mandatory. Prior to participation, each subject provided their informed consent. Sufficient time was given to subjects to read, comprehend, and answer all the questions, and the subjects could not change their answers after submission of the questionnaire. The subjects were given a week's time to voluntarily complete the questionnaire, and those who did not respond back to the questionnaire within the defined time and on three or more consecutive reminders were declared nonrespondents and were not included in the data analysis. The questionnaire was checked for completeness by the investigator himself, and incomplete questionnaires were excluded from the study. All information pertaining to the subjects was kept anonymous and confidential. The study was performed following the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) guidelines.

Data analysis

Data was collected and entered into an MS Excel worksheet, which was then coded and cleaned for any errors. IBM SPSS Statistics for Windows, Version 22.0, was used to analyze the data (IBM Corp. Armonk, NY, USA). More variables were added during the cleaning of the data to enable variable association easily. Before doing frequency testing, clear values for various outcomes were specified. Categorical data were presented as percentages (%), while quantitative data were presented as mean (standard deviation) and median (IQR). Cronbach's alpha (α) was used to assess the internal consistency of the domain item responses. A score of equal or less than the median score for various barrier domains was considered poor. Chi-square analysis was used to find the association between the poor barrier scores of subjects for various domains and their baseline characteristics. All tests were performed at a 5% level of significance; thus, an association was significant if the *P* value was less than 0.05.

Ethical consideration

All ethical issues were followed during the study. Participation was voluntary, and subjects were allowed to withdraw from the study at any moment. No personal data was recorded. Subjects were assured that all data collected was used only for the current study. The study was initiated after approval from IERB (Project ID: IERC/21/02/001). Additionally, before filling out the questionnaire, participants were asked to give their consent to participate in the study.

Results

In the present study, out of 105 eligible subjects, only 98 participated in the study. Among the subjects, 72.4% were males (71/98) and 27.6% were females (27/98), and half of the subjects were below 35 years of age (49/98), with a mean age

of 36.06 ± 6.48 years. Nearly two-fifths of the subjects (44/98) were either senior residents or demonstrators [Table 1].

[Figure 1a-c] shows the frequently mentioned barriers to research by the subjects: lack of mentorship (37.0%), lack of research training facility at the college to solve individual research problems or ambiguities (45.9%), lack of manpower (39.8%), lack of skill to use computer-based hardware and software (42.9%), lack of acknowledgement of research/scientific achievements (41.8%), and lack of sufficient financial budget for research activities among various stakeholders (57.1%).

[Figure 2] shows that the highest mean score among various domains was for the individual (3.08 ± 0.91) and scientific level (2.97 ± 1.14) domains of research barriers, whereas the lowest mean score was for the research facility (2.25 ± 0.83) and finance level (2.04 ± 0.82), which shows that these two barrier domains are major barrier domains to be focused on at an institution. Also, assuming the median score as the cut off for

Table 1: Baseline characteristics of subjects (n=98)

Variables	Frequency/ Mean	Percentage/ SD
Gender		
Male	71	72.4
Female	27	27.6
Age (in years)	36.06	6.48
Age groups		
<35 years	49	50.0
36-40 years	26	26.5
>40 years	23	23.5
Designation		
Senior Resident/Demonstrator	44	44.9
Assistant Professor	33	33.6
Associate Professor	13	13.3
Professor	8	8.2
Total year of experience in the current institution		
<1 year	17	17.3
1-3 years	53	54.1
>3 years	28	28.6
Mean	2.11	0.99
Total publication PubMed Central/Scopus/DOAJ/Embase indexed journals		
<5	63	64.3
5-10	23	23.5
>10	12	12.2
Publications in current institution PubMed Central/Scopus/DOAJ/Embase indexed journals		
<2	68	69.4
2-5	27	27.6
>5	3	3.0
CME/Conferences/workshops for research methodology attended in or after joining the current institution		
Yes	53	54.1
No	45	45.9

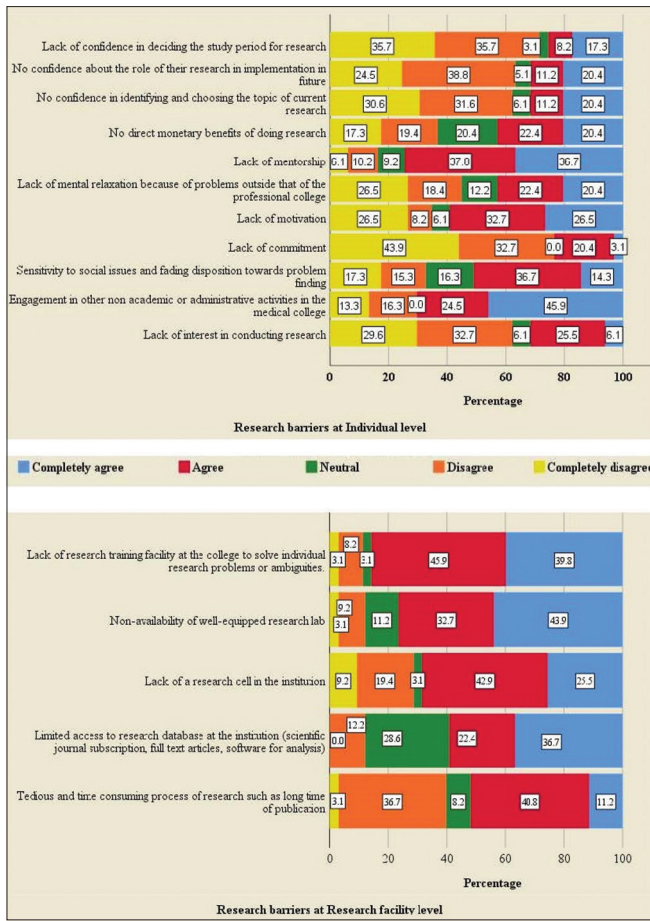


Figure 1: (a). Distribution of perceived research barriers for items of individual and research facility domains among subjects (N = 98)

deciding scores for various domains as “good” or “poor,” it was observed that more than half of the subjects had poor scores for all domains for research barriers [Figure 3].

Table 2 shows the association of good or poor scores for various barrier domains with the baseline characteristics of subjects, and it was found that a poor score for the organizational-managerial level domain was significantly associated with a subject’s age, designation, and gender ($P < 0.05$).

Discussion

This study has identified a lack of research training facilities at the college to solve individual research problems or ambiguities and a lack of sufficient financial budget for research activities among various stakeholders as the largest barriers to research activity, which was supported by studies by Cocal *et al.*^[17] and Okoduwa *et al.*^[18] The study by Pakdaman *et al.*^[19] also showed that a lack of sufficient familiarity with research methods and statistics was the most important obstacle for the subject to carrying out research activities.

Only one-fourth of faculty agreed (28.6%) that lack of time for research due to high engagement in health and treatment affairs

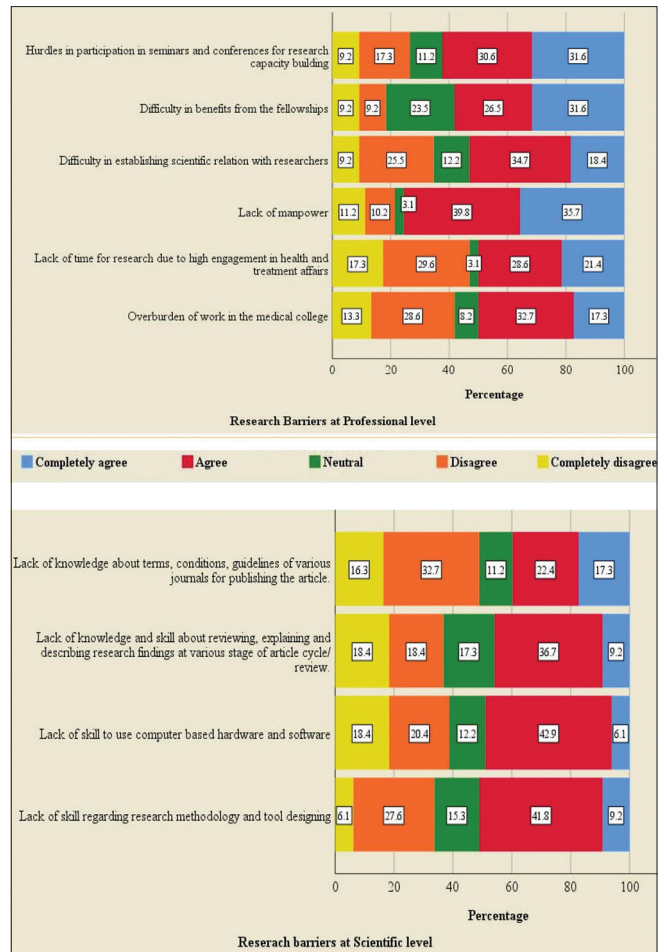


Figure 1: (b). Distribution of perceived research barriers for items of Professional and Scientific domains among subjects (N = 98)

was acting as a barrier to research activity. "This was supported by the studies conducted by Pager *et al.*,^[20] Ellis *et al.*,^[21] and Wenke *et al.*,^[22] where barriers identified to research were more likely to be extrinsic factors such as workload and lack of time, but was contrary to the study conducted by Nath *et al.*,^[15] where around 60% of the faculty members reported having sufficient time for conducting research."

The individual factors (lack of commitment and lack of personal interest by the faculty to conduct research projects) are the least important limiting factors, which is fortunate as they are probably the hardest to overcome. In the study by Conradie *et al.*,^[23] barriers included lack of a dedicated research team (47.7%), reliable internet access (32.6%), and staff skilled in research (31.8%). In the study among residents conducted by Fournier *et al.*,^[24] it was shown that barriers to research include limited dedicated time (64%), insufficient financial resources (55%), and a lack of education in research (45%).

The mean scores for the research facility and organizational-managerial domains were 2.25 ± 0.83 and 2.66 ± 0.94 , respectively. The study by Holden *et al.*,^[25] showed that the mean score for each organization, team, and individual domain was 5.4 (IQR 3.9–7.7), 4.4 (IQR 2.6–6.1), and 3.9 (IQR

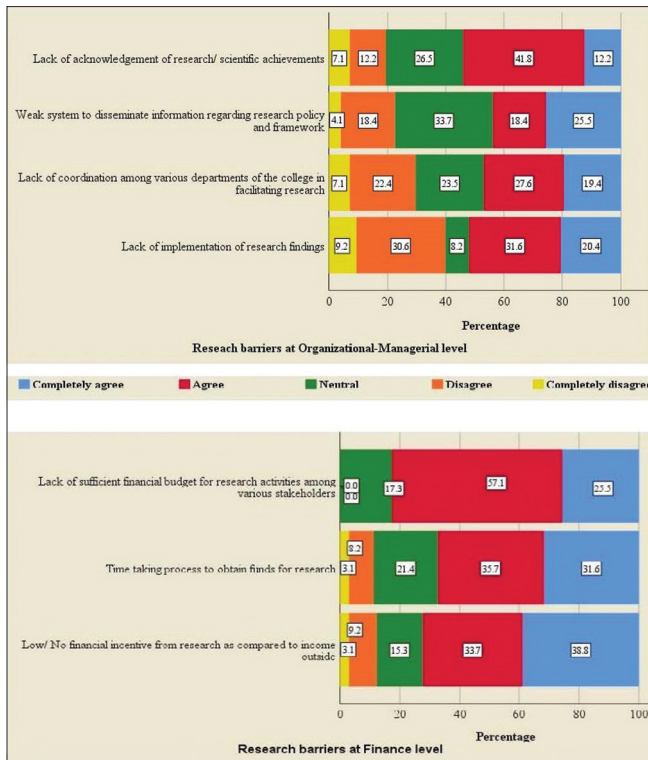


Figure 1: (c). Distribution of perceived research barriers for items of Organizational and Finance domains among subjects (N = 98)

2.9–6), respectively. Similarly, the study by Lyons *et al.*^[26] also reflected the organization and communication domains as major barriers to research. Another study by Farzaneh *et al.*^[27] showed that administrative restrictions and regulations (73.3%) were the most important organizational restraining factors for doing research. In the study by Ataee *et al.*,^[28] when the average score for individual obstacles was compared with the mean rating of the organizational barriers, it was shown that the regulatory barriers average was higher than the personal obstacles average ($P < 0.05$).

When assessed on the basis of gender, the poor score for each individual domain was significantly higher among females, which was opposed by Marrone *et al.*,^[29] which showed that over the past decade, the overall proportion of women as researchers has increased significantly. Also, the study by Witteman *et al.*^[30] showed that research-related gender differences among faculty members where gender gaps in grant funding are attributable to less favorable assessments of women as principal investigators, not to the quality of their proposed research. Findings from the study conducted by Lone and Hussain^[31] clearly show that, comparatively, males have a higher average productivity than females for all the performance indicators, especially research productivity, patent creation, funding, and collaboration across regions and disciplines. However, the gap is narrowing with the passage of time. The study by Hagan *et al.*^[32] found that female faculty generally perceive research to be of greater personal relevance than male faculty, but lack of time is a greater hindrance to

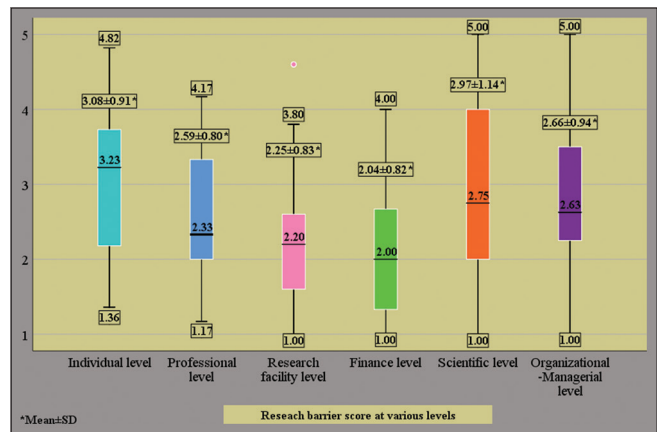


Figure 2: Whisker Box plot distribution for the perceived research barriers score for various domains among subjects (N = 98)

their research activity compared to male faculty, particularly in allied health professions.

One might speculate that younger faculty are more likely to just be happy to have a first job in academia, but it was revealed in the present study that designation, gender, and age of faculty had no difference in the poor research score for various domains, except for the organization-managerial domain. Similar findings were observed in the study by Safdari *et al.*,^[33] where faculty members confirmed that although all barriers affected research activities, organizational-managerial barriers had the greatest effect. Furthermore, Hagan *et al.*^[32] found that a teaching individual's age was inversely related to their level of satisfaction with research possibilities ($r = -0.283$, $P = 0.019$), but neither total time at the institution nor educational qualifications were significant predictors of any of the outcomes ($P > 0.05$).

The limitations of this study are associated with the convenience sampling method utilized and its single-centric nature, which may limit the generalizability of the study findings.

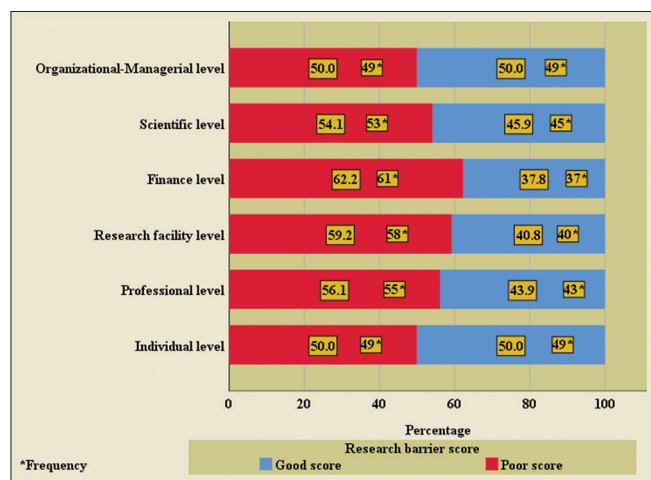
The researchers from this institution will be prospective human resources for building the research capacity of family physicians and primary care physicians in order to produce high-quality research that will influence primary care delivery and improve population health outcomes. Increasing research capacity necessitates local academics' skills, training, infrastructure investment, and support, as well as primary care physicians' or family physicians' ability to select, host, and manage locally needed research as well as disseminate findings to influence local practice and policy.^[34,35]

Conclusion

The present study identified the barriers faced by the researcher at various levels. Despite the presence of a young workforce, it was surprising to notice that more than half of the faculty members had poor research barrier scores in each of the six domains, and the most common barrier was a lack of sufficient financial budget

Table 2: Association of perceived research barriers score with baseline characteristics of subjects (n=98)

Variables	Poor Research barrier score [n (%)]					
	Individual level (n=49)	Professional level (n=53)	Research facility level (n=61)	Finance level (n=58)	Scientific level (n=55)	Organizational-Managerial level (n=49)
Age group						
<35 years (n=49)	24 (48.9)	23 (46.9)	36 (73.4)	37 (75.5)	28 (57.1)	17 (34.9)
35-40 years (n=26)	14 (53.8)	18 (69.2)	17 (65.3)	11 (42.3)	15 (57.7)	17 (65.3)
>40 years (n=23)	11 (47.8)	12 (52.2)	8 (34.8)	10 (43.5)	12 (52.2)	15 (65.2)
P	0.896	0.178	0.006*	0.004*	0.908	0.013*
Gender						
Male (n=71)	30 (42.4)	39 (54.9)	40 (56.3)	43 (60.5)	37 (52.1)	44 (61.9)
Female (n=27)	19 (70.3)	14 (51.8)	21 (77.8)	15 (55.6)	18 (66.7)	5 (18.5)
P	0.012*	0.784	0.05	0.652	0.194	<0.05*
Designation						
Senior Resident/Demonstrator (n=44)	23 (52.3)	26 (59.1)	29 (65.9)	25 (56.8)	31 (70.5)	11 (25.0)
Assistant Professor (n=33)	16 (48.5)	14 (42.4)	23 (69.7)	22 (66.7)	16 (48.5)	22 (66.7)
Associate Professor/Professor (n=21)	10 (47.6)	13 (61.9)	9 (42.8)	11 (52.3)	8 (38.1)	16 (76.2)
P	0.919	0.250	0.111	0.530	0.027*	<0.05*

**Figure 3:** Distribution of perceived research barriers score of various domains among subjects (N = 98)

for research activities among various stakeholders (57.1%). It was found that the poor score for the organizational-managerial level domain was significantly associated with the subject's age, designation, and gender ($P < 0.05$). This study will indirectly benefit not only patient care, but also medical education, health expenditure reduction, and community benefit. This study will help in addressing the gaps in the research environment at the beginning foundation level of this medical college and also contribute to creating a better research environment in this growing institution.

Declaration of patient consent

The authors certify that they have obtained all appropriate participant consent forms. In the form, the participants have given their consent for their images and other clinical information to be reported in the journal. The participants understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

References

- Bowling A. Research Methods in Health: Investigating Health and Health Services. 2nd ed. Philadelphia, Pennsylvania: Open University Press; 2002.
- Doyle MP. Academic Excellence: The Role of Research in the Physical Sciences at Undergraduate Institutions. Tucson, Arizona: Research Corporation; 2000.
- Whitcomb ME. The medical school's faculty is its most important asset. Acad Med 2003;78:117-8.
- Sadana R, D'Souza C, Hyder AA, Chowdhury AM. Importance of health research in South Asia. BMJ 2004;328:826-30.
- Dandona L, Yegnanarayana S, Jyothi MN, Bhaskar VSU, Dandona R. The lack of public health research output from India. BMC Public Health 2004;4:1-12.
- Hennink M, Stephenson R. Using research to inform health policy: Barriers and strategies in developing countries. J Health Commun 2005;10:163-80.
- Majumder MA. Issues and priorities of medical education research in Asia. Ann Acad Med Singap 2004;33:257-63.
- Nejatizadeh A, Sarnayzadeh M, Kahnouji K, Ghasemi R, Nakhodaei N. Constraining factors of research among faculty members at Hormozgan University of Medical Sciences. Electron Physician 2016;8:2405-9.
- Ray S, Shah I, Nundy S. The research output from Indian medical institutions between 2005 and 2014. Curr Med Res Prac 2016;6:4-6.
- Albert M, Hodges B, Regehr G. Research in medical education: Balancing service and science. Adv Health Sci Educ Theory Pract 2007;12:103-15.
- Tullu MS, Karande S. Quality research in Indian medical colleges and teaching institutions: The need of the hour. J Postgrad Med 2016;62:213-5.

12. Bavdekar SB, Tullu MS. Research publications for academic career advancement: An idea whose time has come. But is this the right way? *J Postgrad Med* 2016;62:1-3.
13. Asokan N, Shaji KS. Methods to enhance capacity of medical teachers for research publications. *Indian J Public Health* 2016;60:154-8.
14. Alamdari A, Venkatesh S, Roozbehi A, Kannan A. Health research barriers in the faculties of two medical institutions in India. *J Multidiscip Healthc* 2012;5:187-94.
15. Nath B, Kumari R. Perceived barriers and effect of knowledge-based intervention on the competencies of medical faculty members towards conducting research. *J Med Edu* 2017;16:e105576.
16. Barriers perceived by researchers in pursuing medical research in an evolving medical college of tribal Madhya Pradesh, India. Available from: https://docs.google.com/forms/d/e/1FAIpQLSeLozyaHkQ0e5bRisxj_fOir-10xpLtPMuh89t-hqOFrot2pQ/viewform?usp=sf_link. [Last accessed on 2021 Jun 01].
17. Cocal CJ, Cocal EJ, Celino B. Factors limiting research productivity of faculty members of a state university: The Pangasinan state university Alaminos city campus case. *Asia Pacific J Acad Res Social Sci* 2017;2:43-8.
18. Okoduwa SIR, Abe JO, Samuel BI, Chris AO, Oladimeji RA, Idowu OO, *et al.* Attitudes, perceptions, and barriers to research and publishing among research and teaching staff in a Nigerian research institute. *Front Res Metr Anal* 2018;3:26.
19. Pakdaman N, Ahmadi MA, Pakdaman R, Malih N. Barriers to research activities of faculty members in Islamic Azad University. *Soc Determinants Health* 2016;2:76-83.
20. Pager S, Holden L, Golenko X. Motivators, enablers, and barriers to building allied health research capacity. *J Multidiscip Healthc* 2012;5:53-9.
21. Ellis N, Loughland T. The challenges of practitioner research: A comparative study of Singapore and NSW. *Australian J Teacher Education* 2016;41:2-16.
22. Wenke RJ, Mickan S, Bisset L. A cross sectional observational study of research activity of allied health teams: Is there a link with self-reported success, motivators and barriers to undertaking research?. *BMC Health Serv Res* 2017;17:114.
23. Conradie A, Duys R, Forget P, Biccard BM. Barriers to clinical research in Africa: A quantitative and qualitative survey of clinical researchers in 27 African countries. *Br J Anaesth* 2018;121:813-24.
24. Fournier I, Stephenson K, Fakhry N, Jia H, Sampathkuma R, Lechien JR, *et al.* Barriers to research among residents in Otolaryngology- Head & Neck Surgery around the world. *Eur Ann Otorhinolaryngol Head Neck Dis* 2019;136:S3-7.
25. Holden L, Pager S, Golenko X, Ware RS. Validation of the research capacity and culture (RCC) tool: Measuring RCC at individual, team and organisation levels. *Aust J Prim Health* 2012;18:62-7.
26. Lyons C, Brown T, Tseng MH, Casey J, McDonald R. Evidence-based practice and research utilisation: Perceived research knowledge, attitudes, practices and barriers among Australian paediatric occupational therapists. *Aust Occup Ther J* 2011;58:178-86.
27. Farzaneh E, Amani F, Molavi-Taleghani Y, Fathi A, Kahnamousi-aghdam F, Fattahzadeh-Ardalani Gh. Research barriers from the viewpoint of faculty members and students of Ardabil University of Medical Sciences, Iran, 2014. *Int J Res Med Sci* 2016;4:1926-32.
28. Ataee M, Hesamzadeh A, Kheradmand M. Research barriers from experts' viewpoints who attended the research workshops of Mazandaran University of Medical Sciences. *J Med Life* 2015;8:12-7.
29. Marrone AF, Berman L, Brandt ML, Rothstein DH. Does academic authorship reflect gender bias in pediatric surgery? An analysis of the Journal of Pediatric Surgery, 2007-2017. *J Pediatr Surg* 2020;55:2071-4.
30. Witteman HO, Hendricks M, Straus S, Tannenbaum C. Are gender gaps due to evaluations of the applicant or the science? A natural experiment at a national funding agency. *Lancet* 2019;393:531-40.
31. Lone FA, Hussain M. Gender variations in research productivity: Insights from scholarly research. *Libr Philos Pract* 2017;2017:1-12.
32. Hagan JL, Armbruster P, Ballard R. Barriers to research among faculty at a health sciences university. *American J Educational Res* 2019;7:44-8.
33. Safdari R, Ehtesham H, Robiaty M, Ziaee N. Barriers to participation in medical research from the perspective of researchers. *J Educ Health Promot* 2018;7:22.
34. Ponka D, Coffman M, Fraser-Barclay KE, Fortier RDW, Howe A, Kidd M, *et al.* Fostering global primary care research: A capacity-building approach. *BMJ Glob Health* 2020;5:e002470.
35. Seaton J, Jones A, Johnston C, Francis K. Allied health professionals' perceptions of interprofessional collaboration in primary health care: An integrative review. *J Interprof Care* 2021;35:217-28.